

(3) Exterior surfaces of the exhaust system shall be designed to minimize accumulation and lodgement of dust or combustible substances and to permit ready access for cleaning.

(e) *Tightness of exhaust system.* All joints in the exhaust system shall be tight to prevent the flow of exhaust gas through them under any condition of engine operation prescribed by MSHA. A tight system shall be obtained by the use of ground joints, or thin metal or metal-clad gaskets. All such joints shall be fitted with adequate through bolts and all gaskets shall be aligned and held firmly in position by the bolts or other suitable means. Such joints shall remain tight to prevent passage of flame or propagation of repeated internal explosions to a surrounding flammable mixture.

(f) *Dilution of exhaust gas.* (1) Provision shall be made to dilute the exhaust gas with and before it is discharged into the surrounding atmosphere. The discharged exhaust gas shall be so diluted with air that the mixture shall not contain more than 0.5 percent, by volume, of carbon dioxide; 0.01 percent, by volume, of carbon monoxide; 0.0025 percent, by volume, of oxides of nitrogen (calculated as equivalent nitrogen dioxide); or 0.0010 percent, by volume, of aldehydes (calculated as equivalent formaldehyde) under any condition of engine operation prescribed by MSHA.

(2) The final diluted exhaust mixture shall be discharged in such a manner that it is directed away from the operator's compartment and also away from the breathing zones of persons required to be alongside the equipment.

(g) *Pressure-gage connection.* A connection shall be provided in the exhaust system for convenient, temporary attachment of a pressure gage at a point suitable for measuring the total back pressure in the system. The connection also shall be suitable for temporary attachment of gas-sampling equipment to the exhaust system. This opening shall be closed by a plug or other suitable device that is sealed or locked in place except when a gage or sampling tube is attached.

#### § 36.26 Composition of exhaust gas.

(a) *Preliminary engine adjustment.* The engine shall be submitted to MSHA by the applicant in such condition that it can be tested immediately at full load and speed. The preliminary liquid-fuel-injection rate shall be such that the exhaust will not contain black smoke and the applicant shall adjust the injection rate promptly to correct any adverse conditions disclosed by preliminary tests.

(b) *Final engine adjustment.* The liquid fuel supply to the engine shall be adjusted so that the undiluted exhaust gas shall contain not more than 0.30 percent, by volume, of carbon monoxide or 0.20 percent, by volume, of oxides of nitrogen (calculated as equivalent nitrogen dioxide, NO<sub>2</sub>) under any conditions of engine operation prescribed by MSHA when the intake air mixture to the engine contains 1.5±0.1 percent, by volume, of Pittsburgh natural gas.<sup>3</sup>

(c) *Coupling or adapter.* The applicant shall provide the coupling or adapter for connecting the engine to MSHA's dynamometer.

NOTE: Preferably this coupling or adapter should be attached to the flywheel of the engine.

Clutches, transmissions, or torque converters ordinarily are not required in the coupling train.

#### § 36.27 Fuel-supply system.

(a) *Fuel tank.* (1) The fuel tank shall not leak and shall be fabricated of metal at least 1/16 inch thick, welded at all seams, except that tanks of 5 gallons or less capacity may have thinner walls which shall be preformed or reinforced to provide good resistance to deflection. A drain plug (not a valve or petcock) shall be provided and locked in position. A vent opening shall be provided in the fuel filler cap of such design that atmospheric pressure is maintained inside the tank. The size of the vent opening shall be restricted to prevent fuel from splashing through it. The filler opening shall be so arranged

<sup>3</sup> Investigation has shown that for practical purposes, Pittsburgh natural gas (containing a high percentage of methane) is a satisfactory substitute for pure methane in these tests.